

## THE GENUS PSEUDOCOCCUS IN CALIFORNIA

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The following study of this difficult genus is manifestly provisional. Much more material is needed to complete the work, and we should be glad to receive specimens of any species of the genus from any source. A synopsis of the females has been a great desideratum, and we have attempted to construct such a synopsis. It now includes all the known native species and most of the introduced forms, though there are some like *Pseudococcus calccolariae*, *P. affinis*, and *P. hymenocleae* recorded as having occurred in the State, which we have not yet seen. These insects are very variable in most of their characters, and minute differences in the antennal articles or bristle arrangement taken alone are not to be depended upon. So we have used only characters, or combinations of characters, which seem to us, *on the average*, to be good. For this reason in using the synopsis, care should be taken to examine numbers of specimens of any form, since even species having normally 8-articled antennae occasionally include specimens with only 7 articles or even with 9. We have not always used in the synopsis characters which we consider of greatest value in distinguishing the species, since we are limited always to the use only of described characters in those species we have not seen.

### PROVISIONAL KEY TO FEMALES OF CALIFORNIA PSEUDOCOCCUS.

- A. Third article of antennae about half the length of the last; spines of anal lobes usually much longer than circumanal spines; body with only powdery wax.
  - B. Antennae 7-articled and very small.
    - C. Antennae with very few hairs, article 4 shorter than 5; body slate colored. Under bark of *Artemisia californica*.  
*artemisiae* n. sp.
    - CC. Antennae with normal number of hairs, article 4 longer than 5; body pinkish. Under bark of *Quercus agrifolia*.  
*agrifoliae* n. sp.
  - BB. Antennae 8-articled, large, and normally haired.
    - C. Antennae with article 2 much longer than 3.
      - D. "Sides with rows of spinneret spine areas"; eggs enclosed in an egg-sac. On *Azalea*.  
*azalcae*.

- DD. Sides without rows of spine areas; eggs not enclosed in an egg-sac. On roots of *Solanum douglasii*.  
*solani*.
- CC. Antennae with article 2 sub-equal with 3, (either may be slightly the longer).
- D. On leaves and in cracks of bark of *Quercus chrysolepis*.  
*quercus*
- DD. On roots of *Eriogonum latifolium*.  
*maritimus*.
- AA. Third article of antennae three-fourths as long or longer than the last; spines of the anal lobes usually not longer than the circumanal spines, (*citri*, *sequoiac*, etc., excepted.)
- B. Lateral margins of all segments with dark callouses bearing two to eight denticles; antennae 7-articled. On roots of *Ramona stachyoides*.  
*Phenacoccus ramonae* n. sp.
- BB. Lateral margins of segments without denticled callouses; antennae 8-articled.
- C. Article 1 of antennae as long as 3 and longer than 2; spines of anal lobes as long as circumanal spines. On *Opuntia* and under the bark of *Sambucus glauca*.  
*obscurus* n. sp.
- CC. Article 1 of antennae shorter than either 2 or 3.
- D. Anal wax appendages as long as entire body; spines of anal lobes much shorter than circumanal spines; on various cultivated plants.  
*longispinus*.
- DD. Anal wax appendages much shorter than the body.
- E. Articles 2 and 3 of antennae sub-equalling 8; anal wax appendages about one-third length of the body.
- F. Article 1 of antennae shorter than 5; viviparous.
- G. Body wholly light yellow, thickly covered with mealy wax; secreting only a white cottony matter, on which the female rests. On the leaves of *Ramona polystachya*.  
*crawii*.

GG. Body dark-olive, almost black, thinly covered with snow-white mealy wax; secreting a cottony sac which finally entirely encloses the female. On *Ephedra californica*.

*ephedrac.*

FF. Article 1 of antennae longer than 5; oviparous.

G. Body dull salmon-brown; eggs laid in a fluffy cottony mass. On *Cupressus macrocarpa*, *Thuja orientalis*, *Araucaria excelsa*.

*ryani.*

GG. Body lead-gray; eggs laid in an ovisac. On *Cupressus governiana*, *Libocedrus decurrens*.

*andersoni.*

EE. Article 2 of antennae distinctly shorter than 8; anal wax appendages much shorter than one-third length of body.

F. Article 3 of antennae shorter than 8.

G. Body yellow; eggs deposited in a cottony mass. On various cultivated plants.

*citri.*

GG. Body gray; eggs deposited in a definite ovisac.

H. Body with conspicuous lateral wax plates; female not at all enclosed in the ovisac. On *sequoia sempervirens*.

*sequoiae.*

HH. Body without conspicuous lateral wax plates; female completely enclosed in the

ovisac. On *Cupressus macnabiana*.

*dudleyi*.

FF. Article 3 of antennae longer than 8; spines of anal lobes not longer than circumanal spines; eggs deposited in an ovisac. On *Cupressus macrocarpa*.

*cupressi*.

***Pseudococcus artemisiae* n. sp.**

This species (Figure 22) is decidedly long and narrow in shape, varying from 1 to 6 mm. in length, and from 1-5 to 2 mm. in width. Due to the lack of covering,

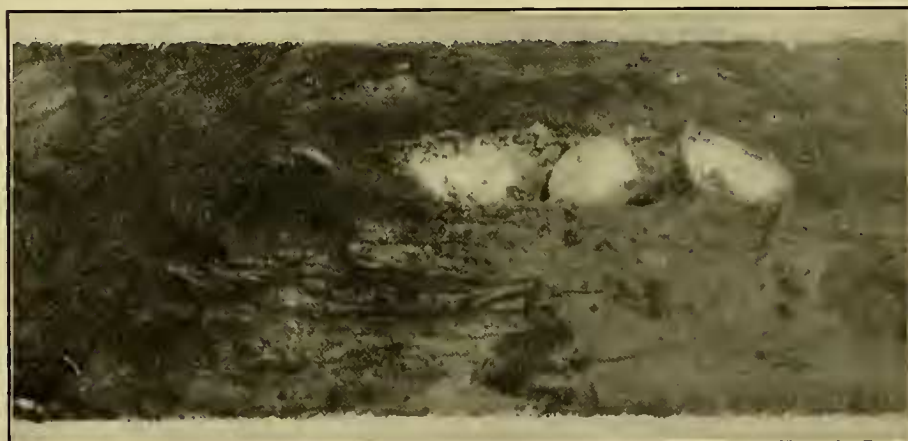


Figure 22. *Pseudococcus artemisiae*

which is but a very fine powdery wax, the segmentation of the body is very distinct. The body is slate colored, without distinct lateral or anal wax appendages. The female encloses herself in a thin cottony sac, and one such enclosed individual can be seen in the figure.

When boiled in K O H, the body becomes cardinal, while the legs and antennae remain transparently yellow.

The antennae are 7-articled (Fig. 23 H), the articles are short and in many cases wider than long. Article 3 is less than half as long as 8. The comparative lengths of the others may be seen in the cut. The mouth-parts are slender—the rostral loop, short. The legs (Fig. 24 H) are normal in length. The femur is longer than the tibia, the tarsus nearly as long as the tibia. The anal lobes (Fig. 25 H) are furnished with spines longer than the circumanal spines. The whole pygidium is rounded, and the segmentation indistinct; there are 3 denticles on either lobe, and few hairs on the body.

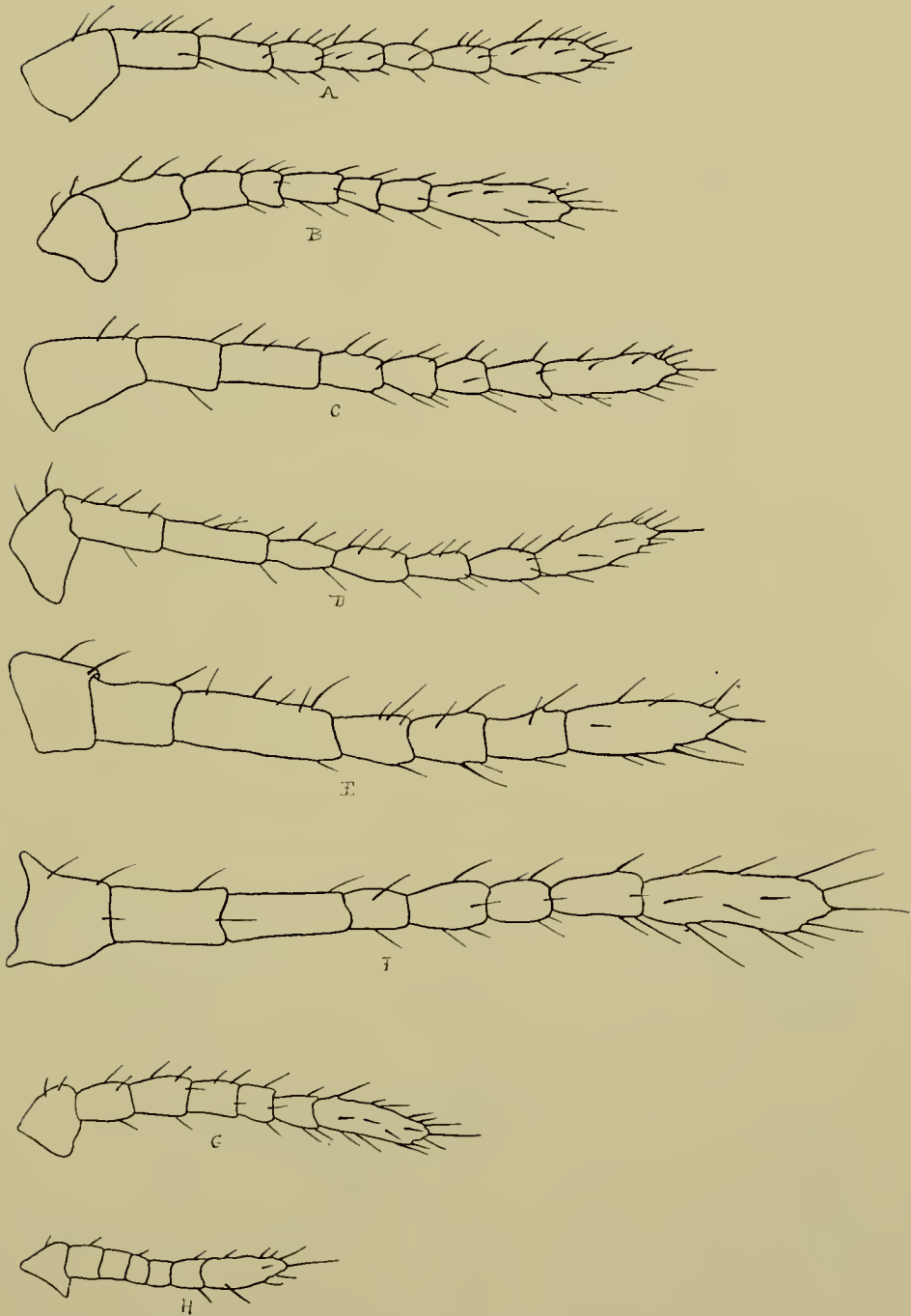


Figure 23. A, *P. obscurus* on *Sambucus glauca*; B, *P. solani*; C, *P. obscurus* on roots of *Opuntia*; D, *P. longispinis*; E, *P. ramonae*; F, *P. citri*; G, *P. agrifoliae*; H, *P. artemisiae*.

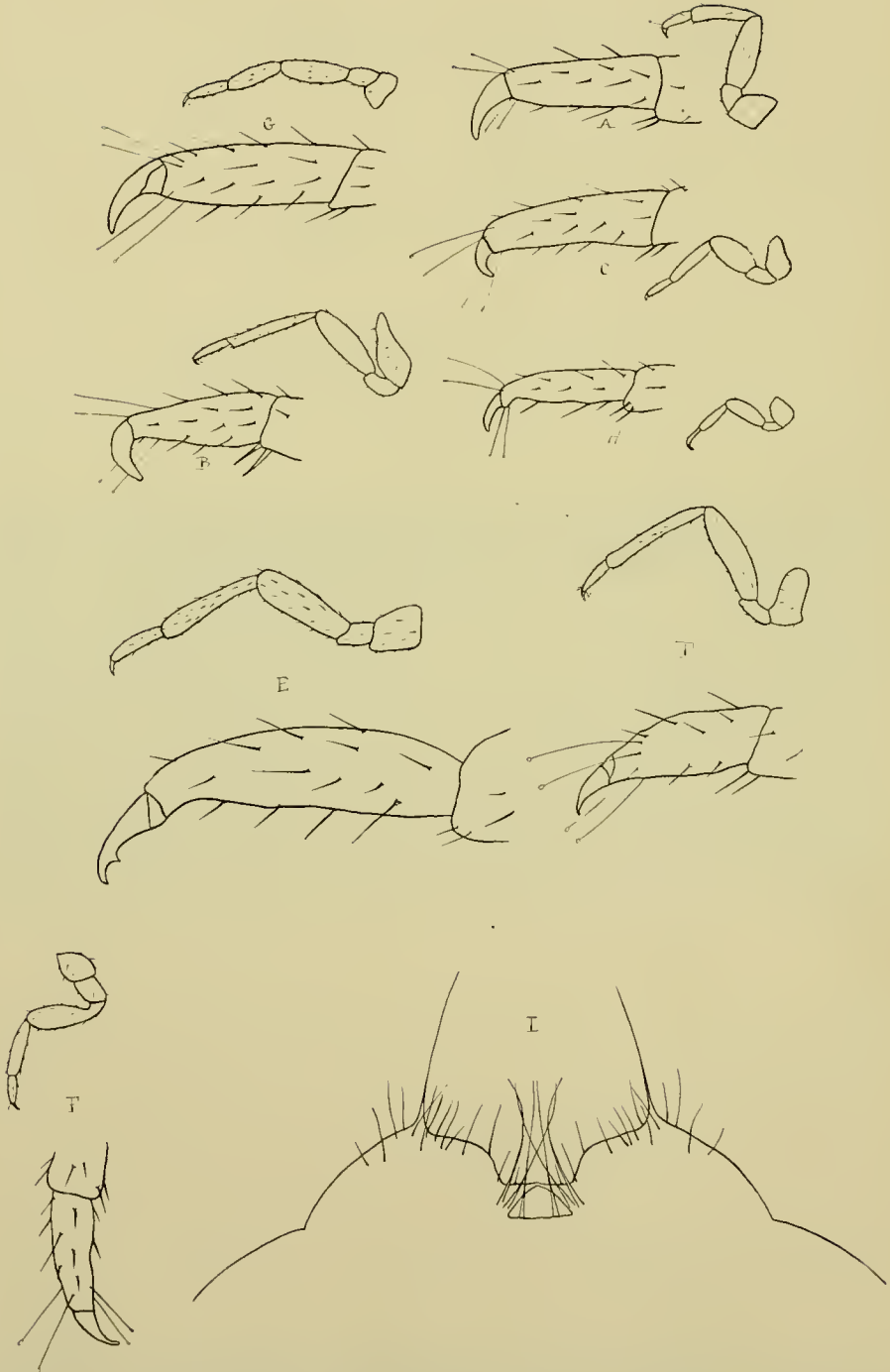


Figure 24. A, *P. obscurus* on *Sambucus*; B, *P. solani*; C, *P. obscurus* on *Opuntia*; D, *P. longispinis*; E, *P. ramonae*; F, *P. citri*; G, *P. agrifoliae*; H, *P. artemisiae*; I, *P. obscurus*: on *Sambucus*

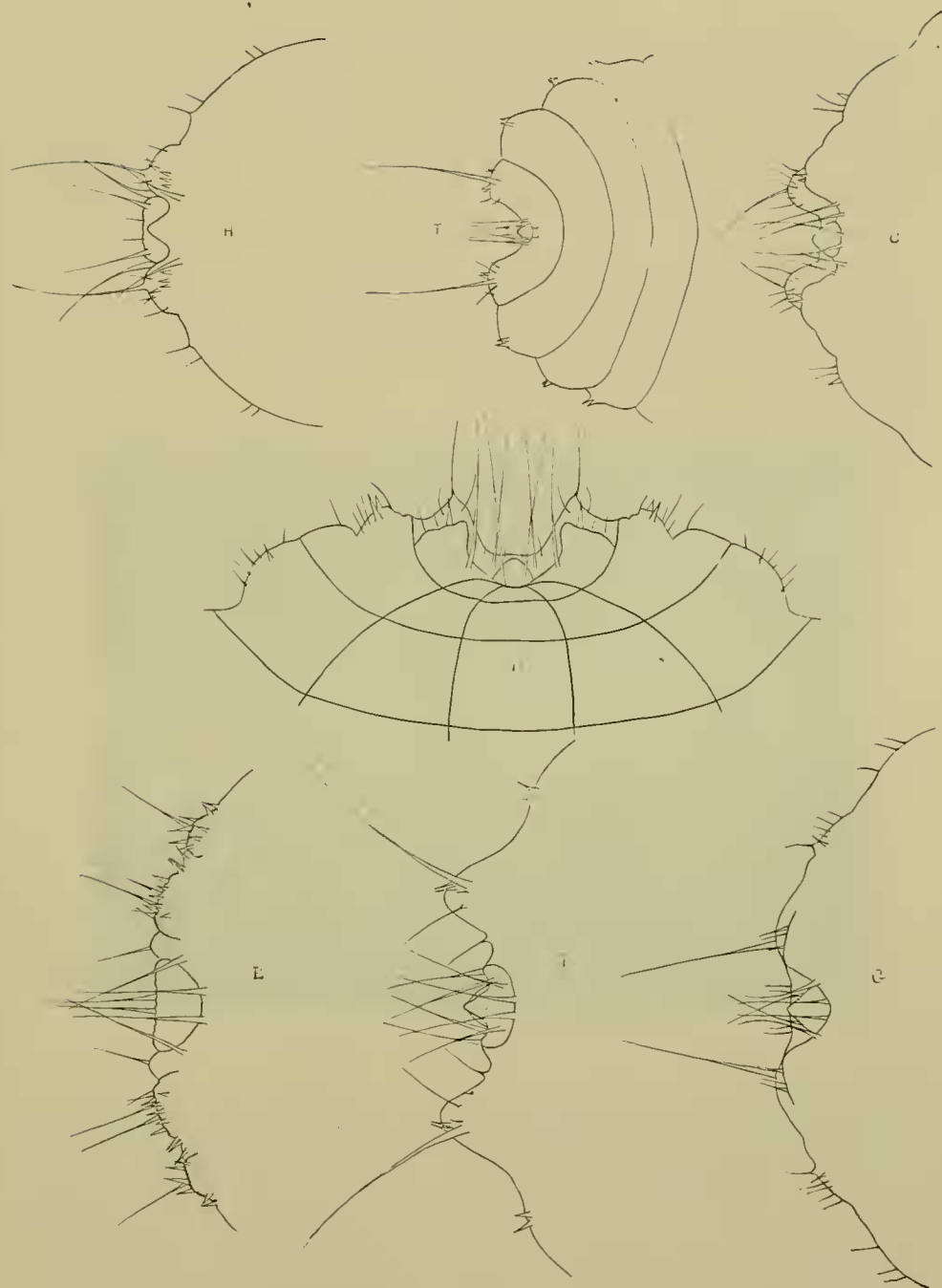


Figure 25. B, *P. solani*; C, *P. obscurus* on *Opuntia*; D, *P. longispinis*; E, *P. ramonae*  
 F, *P. citri*; G, *P. agrifolae*; H, *P. artemisiae*



***Pseudococcus agrifoliae* n. sp.**

This species occurs scatteringly under the bark of *Quercus agrifolia*. So far, it has been taken only in the locality of Claremont.

This species (Figure 26) is more or less oval in shape, although many may be found which are decidedly oblong. In length the body varies from 2 to 6 mm., and in width from three-fourths to nearly the length. The pink body, though nearly naked, is slightly covered with a fine white powdery wax, without distinct lateral or anal wax appendages.

When boiled in K O H, the body becomes cardinal—the antennae and legs remain light-yellow.

The antennae (Figure 23 G) are 7-articled—the third article being about half the length of the last. The comparative lengths of all the articles are shown in the illustration. The mouth-parts are long, reaching nearly to the middle coxae. The legs (Figure 24 G) are light brown, of medium length, and covered with



Figure 26. *Pseudococcus agrifoliae*

hair. See the cut for the comparative lengths of the different parts. The spines of the anal lobes (Figure 25 G) are twice as long as the circumanal spines. Each lobe is furnished with two ventral denticles. There is very little or no hair on the body.

This species lives beneath the bark and in the cracks of the bark of *Quercus agrifolia*. It was first taken by P. E. Smith at Santa Paula. It differs from *P. quercus* in the following:

*P. quercus* :—Body, greenish-brown; antennae, 8-articled; tarsus, one-third as long as tibia; host-plant, *Quercus chrysolepis*.

*P. agrifoliae* :—Body, pink; antennae, 7-articled; tarsus, nearly as long as tibia; host-plant, *Quercus agrifolia*.



***Pseudococcus obscurus* n. sp.**

In form this species is very narrowly oblong. The body segmentation is very distinct. The length of the body varies from 2 to 6 mm., the width from 1 to 2 mm. The covering consists of a very thin, powdery wax, which does not hide the light-gray body of the insect. The lateral wax appendages are not distinct, while those of the anal segments, though short, are well defined.

When boiled in K O H, the body becomes cardinal—the legs and antennae remain a light-brown.

The antennae (Figure 23 C) are 8-articled, and normal in size and in the distribution of hair. Article 3 is three-fourths as long as the last. Article 1 is as long as 3 and longer than 2. The mouth-parts are short and stout; the rostral loop about half the length of the body. The legs (Figure 24 C) are short and stout. The coxa is as broad as long; the tibia is longer than the femur, and twice as long as the tarsus; the claw is short and well curved. The spines of the anal lobes are as long as the circumanal spines (Figure 25 C). The lobes are quite hairy, with two denticles on the inner margin of each. The body is nearly destitute of hair.

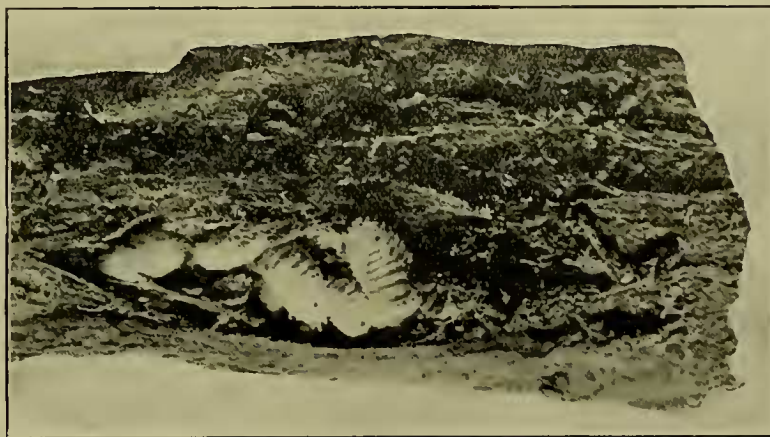


Figure 27. *Pseudococcus obscurus* on *Sambucus glauca*

The eggs are laid in loose cottony masses. The male is unknown.

This species was taken from the roots of *Opuntia* at the home of Mr. Meserve, County Horticultural Commissioner, on Boyle Heights, Los Angeles. In some ways it resembles *P. ryani*, but differs as the antennae shows in the following comparative table of the different articles beginning with the longest article first:

*P. ryani*:—8, 3, 2, 4, 1, 6, 5, 7.

*P. obscurus*:—8, 1, 3, 2, 4, 7, 5, 6.

A form taken at Santa Paula (Figure 27) from the bark of *Sambucus glauca* resembles *P. obscurus* closely enough to be the same species or a variety of it. The following cuts will point out some of the resemblances: Fig. 23 A; Fig. 24 A; Fig. 24 I.

It was first taken by County Commissioner P. E. Smith, of Santa Paula.

***Phenacoccus ramonae* n. sp.**

The form (Figure 28) is distinctly oval, tapering slightly toward the anal end. The body varies from 4 to 6 mm. in length, and from 1 to 3 mm. in width. The covering is a snow-white cottony wax, which entirely hides the insect's body. The segmentation is very distinct. Along the median line of the dorsum there extends a well-defined ridge, on either side of which is a similar indistinct ridge parallel to it. On the margin of each segment is a stout waxy lateral plate, the two anal wax plates being twice as long as any of the rest, and much heavier. Beneath the covering the body is greenish-yellow. When treated with K O H the body becomes perfectly colorless and transparent, the legs and antennae remain brown.

The antennae (Figure 23 E) are 7-articled, long and rather stout. Article 3



Figure 28. *Phenacoccus ramonae*

is longer than 8. The comparative lengths of the remaining articles may be found in the cut. All of the articles are hairy. The mouth-parts are short and stout—the rostral loop, reaching nearly to the caudal end of the body. The legs (Figure 24 E) are long, stout, and covered with short hair. The femur is longer than the tibia, the tarsus about one-half the length of the tibia, the claw is slightly curved with a tooth on the inner margin. The spines of the anal lobes (Figure 25 E) are shorter than the six circumanal spines. The body is covered with hair. On the lateral margins of all the segments are dark callouses bearing from 2 to 8 denticles.

Although a large number of specimens were taken no eggs were to be found. They are probably viviparous.



Figure 29. *Phenacoccus ramonae*

The adult male is yet unknown, but the pupa-cases (Figure 29) were taken in considerable numbers.



Figure 30. *Phenacoccus ramonae*

The insect lives in great numbers (Figure 30) in the ground on the roots of the Black Sage, *Ramona stachyoides*.



It has also been taken from the foliage of *Diplacus glutinosus*, in the canyons above Claremont.



Figure 31. *Pseudococcus citri*

***Pseudococcus citri* (Risso)**

It is to be noted that this species (Figures 31 and 32) as it occurs in California, has been treated very fully in Bulletin No. 1 of the Claremont Pomological Club, Claremont, California, February, 1909.

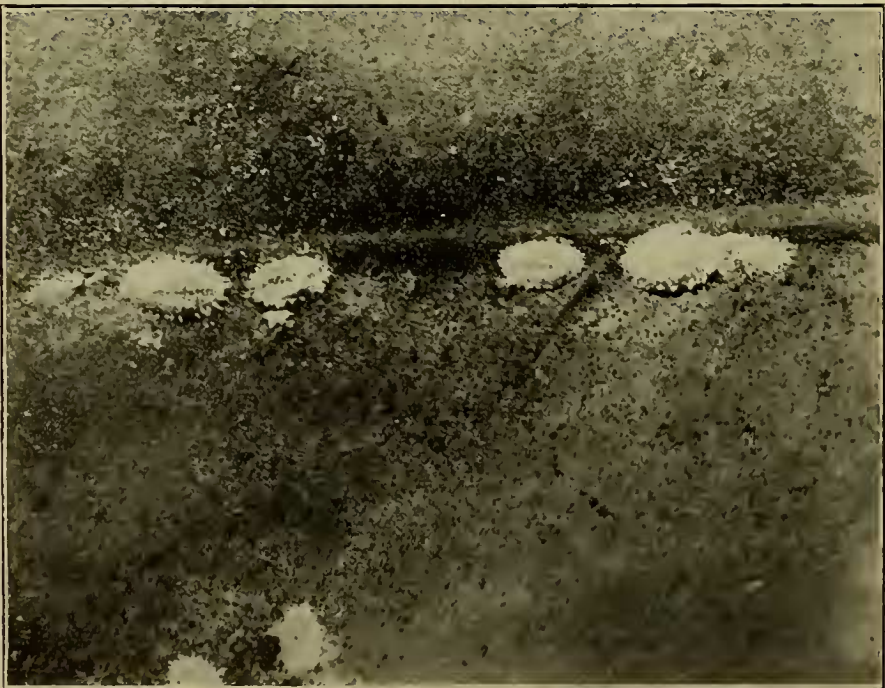


Figure 32. *Pseudococcus citri*